H. St. John.

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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 31. August, 1929. No. 368.

NOTES ON FALL-FLOWERING PLANTS OF THE CENTRAL MISSISSIPPI RIVER VALLEY

H. C. Benke

Findings in the genus *Aster* during my trip in the fall of 1927, across Illinois southward as far as the region about St. Louis, Mo., were given in the April, 1928 issue of Rhodora. The succeeding aster-flowering season—fall of 1928—found me on the way early and on a more extensive trip which carried me overstate and zig-zaging from one side of the great Mississippi River to the other as far south as the northern borders of the state by the same name and the adjoining state of Arkansas across the river on the west.

During the entire trip and over the whole season when asters were in flower, extending even beyond the time of frosts, unusual or new specimens were secured, ranges were observed, colorations noted and many field notes jotted down, the more interesting of which are here recorded. Plants of other genera in flower and fruit at the time also came under observation—and these were not slighted but scrutinized as well, furnishing additional material which is included in this paper as being of possible help in taxonomic work.

So, in *Gramineae* it was noted that in our northern range (northern Illinois) the species *Agrostis alba* L. was, in the main, of erect habit—scarcely decumbent. On proceeding southward the species was more and more tending to become stoloniferous and rooting at many nodes. Pastures were not considered but the species was sought out in woodlands or other uncultivated areas where it could have been more thoroughly naturalized. To illustrate this peculiarity, a specimen has been placed in Field Museum from Bloomfield, Johnson County, Ill., *Benke 4664*. Anomalous, in this connection, is this character

as observed in the species *Leersia oryzoides* (L.) Sw. (*Homalocenchrus oryzoides* (L.) Poll.) which is mostly decumbent in its habit in the Chicago region, while specimens seen down-state were very strict, as a rule. On file from the same locality as before, is *Benke 4669* which gives a fair sample of this species through that region. This item, probably, is more of ecological interest.

About Anna, Union County, Ill., were found specimens of *Aristida dichotoma* Michx. (*Benke 4692*), sparingly established in the hilly woodlands, which were very weak but tall; no other characters could be uncovered to warrant the separation of a variety or form from the species. A specimen similar to mine is in Field Museum Herbarium: Illinois: barrens, Menard County, *E. Hall,* Museum no. 314281.

A sharp lookout was kept for *Arundinaria tecta* (Walt.) Muhl. as the journey proceeded southward, but no colonies of plants were observed until the streamlets of the Illinois Ozarks were reached in Johnson County—*Benke 4696.* When one first sees this plant—cane-brake, along with cypress, magnolia and live-oak species—he begins to feel that he has arrived in the "Southland" indeed. In Field Museum are also specimens of *Arundinaria* from farther north but in the Wabash River Valley. Illinois: Richland County, *Ridgway 155; 263;* Mt. Carmel, Wabash County, *Patterson,* Museum no. 135116.

Specimens of *Froelichia* which conform to the characters of *F. gracilis* Moq.—a plant of the western plains—were seen about Cairo, Ill. (*Benke 4714*) and the tropical weed *Boerhaavia erecta* L. was found nearing its northern range-limit toward the Missouri-Illinois border. The specimen on file in Field Museum is from Hulbert, Arkansas (*Benke 4715*).

Lespedeza striata (Thunb.) H. & A. of the Illinois hill country, running wild beyond Bloomfield (some miles to the northeast) is not of the usual diffusely branched prostrate habit but quite erect and but little branched or nearly simple (*Benke 4876*).

A fine specimen of *Rhamnus cathartica* L. was found established in the virgin woodlands about Trout Park, north of Elgin, Ill. (*Benke 4742*) far removed from any cultivated area. From the same territory all specimens examined of *Psedera quinquefolia* (L.) Greene proved to be of the variety *hirsuta* (Donn) Rehder (*Benke 4743*).

It was interesting to observe the very showy *Passiflora incarnata* L. running perfectly wild and thoroughly established so far north as

the region about Metropolis, Massac County, Ill. (*Benke 4747*). Possibly it should be regarded as native to the region.

About Elgin, Ill. a number of specimens of *Sanicula* were studied. But they all proved to be *S. gregaria* Bicknell (*Benke 4754*).

The curious fact was noted that all plants of the species *Asclepias perennis* Walt. of the region about Cairo, Ill. had *very bright green* stems, quite striking even from a considerable distance (*Benke 4757*). Another curious sight arresting one's attention was observed along the lowlands of the Ohio River about Metropolis, Massac County, Ill. where Ipomaeas of several species—*I. coccinea* L., *I. lacunosa* L. and *I. purpurea* (L.) Lam.—red- white- and blue-flowering were intertwined and all blooming together, yet all distinct with no signs of hybridism apparent! Specimens were taken to be placed in the Field Museum Herbarium together with duplicates.

Several examples of exceeding thrift and vigor in plants under favorable conditions may be cited: in the rich bottoms of the Mississippi about Cairo, Ill. there were some great individuals of *Scutellaria lateriflora* L., bushes of nearly two meters in diameter and a meter in height! (*Benke 4774*). *Lobelia cardinalis* L. showed similar tendency to attain exceptional size about Horn Lake, Mississippi (*Benke 4788*). And *Boltonia asteroides* (L.) L'Hér. in some colonies about Niles (northwest of Chicago) forms regular "jungles," the plants running between two and three meters in height.

In the neighborhood of Trout Park, Elgin, Ill. the white-flowered form of *Solanum Dulcamara* L.—forma *albiflorum* House—as a rule seen only occasionally, occurs quite as frequently as the species with purple flowers, or even more so.

About Justice Park, Chicago, several colonies of *Aster Drummondii* Lindl. were found which were of lower stature than common and the stems, and leaves on their upper surfaces, were very rufescent but the separation of a variety or form on these characters alone does not seem justifiable unless study from season to season discloses that these differences are permanent (*Benke 4882*).

There was seen to the north of Elgin near Trout Park Preserve a considerable colony of Asters reminding one at a glance of the inflorescence of *Aster lateriflorus* (L.) Britton but of the leaf-characters of *Aster lucidulus* (Gray) Wiegand. By closer study these intermediate characters become quite apparent, strongly suggesting that the colony may be of hybrid origin, especially since the two species

mentioned grew in the closest proximity. Specimens were taken in duplicate (*Benke 4833*) but as the plants of the entire colony were unsound, the branchlets, smaller leaves and bracts, more especially, having been attacked, it appears, by a rust of some kind, a hybrid cannot now be announced and published, the colony requiring further observation for another year or longer. It may be a case for phytopathology rather than for taxonomy!

It is now in order to cite the apparently new material secured on the extended trip.

I. To the northeast of Memphis, Tennessee there was found a species of *Uniola* resembling *U. laxa* (L.) BSP. but at once striking for its lengthened nodding filiform culm, nearly simple inflorescence and single-flowered spikelets. On account of the latter, its most striking character, it may be called

Uniola uniflora, spec. nov., *U. laxam* simulans; culmis fragilioribus, supra cernuis, filiformibus; panicula spiciformi simplicissima vel remote pauciradiata, radiis brevissimis, 1- raro 2-spiculatis; spiculis 1- raro 2-floris; glumis 3–3.5 mm. longis aliquam hyalinis (praecipue palea) plerumque eroso-ciliatis.—Tennessee: Memphis, Sept. 19, 1928, *H. C. Benke 4874* (type, Field Museum).

In its character as to roots, length of culms and width and length of leaves resembling *U. laxa* (L.) BSP. (*U. gracilis* Michx.) but differing by its weaker culms, nodding and filiform; inflorescence long and distantly spicate—a simple spike or at most one to several very short and distant branches (which bear one or two one-flowered spikelets); spikelets single-flowered, rarely two-flowered; florets with their glumes averaging conspicuously smaller, 3–3.5 mm. in length; the flowering glumes, and palea particularly, more delicately hyaline in texture, mostly erose or even erose-ciliate margined.

That the new species cannot be regarded as a weak development of *U. laxa* may readily be seen by comparing it with depauperate specimens of that species which run to stronger culms, definitely larger and multi-flowered (3–6) spikelets, even in the weakest plants as observed both in the field and in the herbarium. Both *U. laxa* (L.) BSP. and *U. longifolia* Scribn. are well-represented in the Field Museum Herbarium, many of the former under its synonym *U. gracilis* Michx., and one specimen entered as such is very typically the new species: Virginia: Richmond, Sept. 26, 1894, *J. J. Carter*, Museum no. 218798.

On reaching the region about Horn Lake, Mississippi, some thirty miles further south, *U. uniflora* was not seen but *U. laxa* and *U. longifolia* were both met with in quantity, but in distinct colonies—best seen in the field—and none were found growing together. All the species, including the new one, were found growing at the edge of rich woods and pastures.

II. Along the streamlets of the Illinois Ozarks beyond Bloomfield and nearing Tunnel Hill in Johnson County a very striking form of *Oxalis* was encountered at several places—remarkable for its viscid-hairiness, on the stem actually woolly! This character was so pronounced that it was noticeable even at a distance, as soon as the plant appeared in sight. The attention was also arrested by the unusually small size of the flowers and their *deep yellow* color.

In the genus *Oxalis* or the Wood-sorrels, it is realized that great caution must be observed in separating varieties or even forms because of the many synonyms and the insecure, indefinite or merging characters. But since specimens in the herbarium of the Field Museum and literature at hand fail to uncover specimens similar to mine it seems necessary to name a new variety:

OXALIS EUROPAEA Jord., var. **lanulosa**, var. nov., caulibus petiolis pedicellisque dense pubescentibus cum pilis viscoso-lanosis; foliis supra plus minusve strigosis vel pilosis; petalis 3–5 mm. longis, intense luteis.—ILLINOIS: Bloomfield, Johnson County, Sept. 22, 1928, *H. C. Benke 4877* (TYPE, Field Museum).

Like the species in inflorescence, size-range of flowers, "stipules obsolete or nearly so," etc.; but stem densely to loosely viscid-woolly; petioles, pedicels, sepals and capsules less so, at least strongly viscid-villous; leaves strigose-pilose on upper surface, some densely so; petals conspicuously small (flowers 3–5 mm. high), *deep* yellow.

Wiegand, in his recent very excellent and critical treatment of *O. corniculata* L. and its relatives, RHODORA 27: 136. 1925, separates the forma *vestita* Wiegand from the variety *Bushii* (Small) Wiegand of the species *europaea* Jord. This seems to be his nearest approach to my new variety. Two of the specimens which he cites are accessible in the Field Museum: ILLINOIS: La Salle County, *Greenman, Lansing & Dixon 144* and Riverdale, *Lansing 2625*. These two plants—of unlike branching habit—both differ from the new variety in the evidently larger petals (6–9 mm. long) very pale in color. This latter character, however, might have been somewhat modified by their preparation for the herbarium. They are pubescent to a

markedly less degree than any of my abundant material, secured from several colonies of the region and uniformly characterized by conspicuously long viscid spreading or tangled-woolly pubescence and small deep-yellow flowers.

III. Trout Park to the north of Elgin, Ill. is not a park in the usual sense, but rather a Preserve with its environs for a mile or so along the bluffy hillsides reaching to the valley of the Fox River, a bit of the original Illinois landscape with its wealth of flora now assured perpetuity by the city of Elgin, which has acquired a goodly portion and included it in its park system. But, unlike the other city parks, it is kept in its natural state as far as possible, having been placed in the custody of the various nature-conserving societies of the city. The region is most unique in that it contains innumerable springs and brooklets so that it is practically drought-proof and free from fire-danger. This makes it the home of age-old trees, among them grand specimens of ancient *Thuja occidentalis* L., White Cedar!

Among the profusion of wild asters that may be expected and which does flourish in such a place is one most conspicuous and beautiful, massed in colonies here and there about the park. Various persons have remarked to me about the abrupt transition in color from intensely blue to rose-red in a few of the colonies, in the same species, *Aster Shortii* Lindl. Having found no mention of this charming color-form, it pleases me to record it here as

Aster Shortii Lindl., forma **Gronemanni**, f. nov., ligulis roseis. Rays rose-red.—Illinois: Elgin (north part), Kane County, Oct. 1, 1928, *Benke 4872* (type, Field Museum).

This is named for Carl F. Gronemann of Elgin, an enthusiastic friend of the flora, President of the Illinois Nature Study Society, who took a leading part in the long campaign to save Trout Park Preserve and who first spoke to me about this attractive aster.

Since this color-form has not been seen elsewhere in my many travels it must be regarded as rare.

IV. *Aster Drummondii* Lindl. is a very common species in the vicinity of Chicago where it is well-marked, as a rule, so one encounters little trouble in its determination. We are used to seeing every shade of blue from very pale to the deeper shades and consequently, color-forms are not to be separated in the blue-rayed specimens. But when one comes upon such a rarity as this species with rose-colored rays and leaf-characters varying from the type

besides, a new variety of this ubiquitous (woodland, field and meadow) species should be separated.

ASTER DRUMMONDII Lindl., var. **rhodactis**, var. nov., strictior, pauce ramoso; ramulis numerosis axillaribus; ligulis roseis.—ILLINOIS: Chicago (Justice Park), Cook County, Oct. 5, 1928, *H. C. Benke 4830* (TYPE, Field Museum).

With the species but appearing rather taller because less branching; many leafy branchlets axillary; leaves smoothish on upper surface; rays rose-colored.

Type and duplicates were secured from several colonies growing in meadow-land to the west of the interurban station of Justice Park. They are very rufescent on stem and upper part of leaves but I should not maintain this to be an essential and constant character of this variety, with the limited observation given it. A specimen of the species with blue rays but with similar rufescence of stem and leaves has been referred to elsewhere in this paper.

V. Among other rarities in Trout Park Preserve and environs is found, in several small colonies, the white-flowered form of the charming *Aster lucidulus* (Gray) Wiegand, which has already been given a formal name but under a different species necessitating the following transfer:

ASTER LUCIDULUS (Gray) Wiegand, forma **albiflorus** (R. Hoffm.), comb. nov. *Aster puniceus* L., var. *lucidulus* Gray, forma *albiflorus* R. Hoffm. Proc. Boston Soc. Nat. Hist. **36**: 339. 1922.

As recorded by House, N. Y. State Mus. Bull. **254**: 703. 1923, white-rayed forms of *Aster puniceus* L., var. *firmus* (Nees) T. & G. have been collected in the state of New York at Hamlin by Beckwith, Pen Yan by S. H. Wright and at Lake Pleasant by Peck. These specimens have not been seen but it is strongly suspected that they may be of the same form as the above. The variety *firmus* of *A. puniceus* has never been satisfactorily separated by me for no specimen was ever encountered either in Wisconsin or in Illinois that would key to *A. puniceus* which was "smooth beneath and sparsely hirsute above" and also had "serrate leaves." All smooth-leaved asters of the group were always but *slightly* if at all denticulate and conformed well in all characters to the variety *lucidulus*, now raised to the rank of a species by Wiegand with the best of reasons, it seems to me, both from observation in the field and from examination of many herbarium specimens.

CHICAGO, ILLINOIS.

MONOGRAPHIC STUDIES IN THE GENUS ELEOCHARIS

H. K. Svenson

(*Continued from page 136*)

6. E. CELLULOSA Torr. Fig. 11. Culms terete, rarely triangular, 3–7 dm. high, 1–2 mm. wide, straw-colored or greenish: roots coarse, pale to dark brown; stolons elongated: the upper sheaths rigid, oblique, with an elongated mucronate tip, often purplish; lowest sheaths membranous and inflated or leaf-like: spikelets cylindric, 1.5–4.5 cm. long, obtuse, thicker than the culm: scales orbicular or obovate, obtuse, 4 mm. long, rigid, striated, straw-colored, with a conspicuous brown border and white scarious margins, the brown coloration sometimes wanting: style 3-fid: stamens 3: mature achene shining, brown, elliptic to obovate, lenticular, with about 20 rows of quadrangular cells, overlaid by a glass-like surface, merging at the summit into a stout, spongy beak, tipped by the short dark style-base: bristles light-brown, equaling the achene, involute, without teeth.—Ann. Lyc. N. Y. iii. 298 (1836); Britton, Journ. N. Y. Micr. Soc. v. 99 (1899); C. B. Clarke in Urb. Symb. Ant. ii. 62 (1900). *Scirpus dictyospermus* C. Wright in Sauv. Fl. Cub. 175 (1873).—Florida to Texas, West Indies, and Central America. FLORIDA: Santa Rosa Island, *Tracy* 8661; Appalachicola, Biltmore herb. (*Chapman*) 3870; Lee Co., Myers, *Hitchcock* 403; Dade Co., *A. A. Eaton* 105; S. Jacksonville, *Curtiss* 6540; Miami, *Garber* in 1877; Titusville, *Nash* 2302; W. Fla., Palm Creek, *Curtiss* 183; Key West, *Blodgett*. MISSISSIPPI: Biloxi, *Tracy* 6503; Horn Island, *Tracy* 7680; Bay of St. Louis (*Ingalls*) as *S. quadrangulatus* Michx. LOUISIANA: Lake Charles, *Cocks* 3126. TEXAS: Fredericksburg, *Engelmann* 494; *Lindheimer* 719; Rio Cabeza, *Thurber* 32 in 1850; *C. Wright* 708 (W. Tex. to El Paso), Rio Grande in 1848. BAHAMA ISLANDS: Andros, *A. E. Wight* 264; New Providence, *Britton & Brace* 505; *Britton & Brown* 305. CUBA: *C. Wright* 3763. YUCATAN: Progresso, *Gaumer* 2402.

Closely related to *E. spiralis*.[1] First described by Torrey from specimens sent from Bay of St. Louis, Mississippi, by Dr. Ingalls.

7. E. FISTULOSA (Poir.) Link. Fig. 3. Culms sharply triangular, coarse, 4–6 dm. high: roots coarse, reddish-brown: sheaths brown, membranous, rather loose, pointed at the summit: spikelets 1.5–3.5 cm. long, cylindric, acute: scales 4 mm. long, straw-colored or gray, broadly ovate, obtuse or somewhat acute, firm, striate; the margins erose but not conspicuously membranous: style 3-fid: stamens 3: achene 2–2.4 mm. long (including the style-base), obovate, turgid, green or light brown, rough, with about 20 rows of deeply pitted quadrangular cells, the apex narrowed to a neck about one-third the width of the achene, broadening again to form the base of the tri-

[1] See discussion under *E. spiralis*.

angular style: bristles coarse, usually exceeding the achene, firmly toothed.—Link in Spreng. Jahrb. iii. 78 (1820); Schultes, Mant. ii. 89 (1824); Boeckl. Linnaea, xxxvi. 472 (1869–1870); Benth. & Muell. Fl. Austr. vii. 293 (1878); C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 626 (1893), in Durand & Schinz, Consp. Fl. Afr. v. 598 (1895), in Thiselton-Dyer, Fl. Cap. vii. 198 (1898), in Thiselton-Dyer, Fl. Trop. Afr. viii. 406 (1902) and Ill. Cyp. t. xxxv. figs. 1–4 (1908); Fernald, Rhodora, xxvii. 39–40, t. 149, figs. 5–10 (1925). *Scirpus fistulosus* Poir. Encyc. vi. 749 (1804). *S. acutangulus* and *S. medius* Roxb. Fl. Ind. (ed. Wall.) i. 216 (1820). *Baeothryon fistulosum* A. Dietr. Sp. Pl. ii. 94 (1833). *Limnochloa acutangula* Nees and *L. media* Nees in Wight, Contrib. Bot. Ind. 114 (1834). *L. fistulosa* Nees, Linnaea, ix. 294 (1835). *E. planiculmis* Steud. Cyp. 80 (1855). —West Indies and tropical South America, Asia, Africa. Cuba: *C. Wright* 3375, 3376. Mexico: Orizaba, *Botteri* 756. Panama: Prov. Panama, Chepo, *Pittier* 4557. Colombia: Polonia, *Killip & Smith* 14914; Aguasucia, *Langlassé* 87; Dept. El Valle, Calima, *Killip* 11247. Galapagos Islands: Chatham Is., *Stewart* 1080. Bolivia: Dept. Santa Cruz, Prov. Sara, *Steinbach* 7444. Paraguay: Sierra de Maracayu, *Hassler* 5676; Cordillera de Villa-Rica, *Hassler* 8589; N. Paraguay, *Fiebrig* 5349. Ceylon: *Thwaites* 3162. India: Nepal, *Wallich;* mountains of Khasia, *Hooker & Thomson.* China: Hupeh, *Henry* 4102. Japan: Katsura, *Sakuraj* 51. Sierra Leone: *Elliot* 4453. Central Africa: Djur, *Schweinfurth* 2326.

Described by Poiret (1804) from specimens collected by Du Petit-Thouars in Madagascar, and by Roxburgh (1820) from India as *Scirpus acutangulus* (*S. medius* is only a smaller form, less sharply angled). Clarke included the American plant under *Eleocharis mutata,* but Boeckeler, as noted by Fernald (l. c.), recognized the American plant as *E. fistulosa. E. planiculmis* was based on *Zollinger* 284 from Java. In the turgid, almost globose achenes, with coarse reticulation, and stout bristles, it seems related to *E. variegata* var. *laxiflora* and *E. philippinensis.* The characteristics differentiating *E. fistulosa* from *E. quadrangulata* and *E. mutata* have been clearly discussed by Fernald (l. c.). According to Clarke (in Thiselton-Dyer, Fl. Trop. Afr. viii. 406), "the corresponding species in Tropical America, *E. mutata,* R. Br., is exceedingly near this, and is united with it, perhaps rightly, by Boeckeler." This statement is not wholly correct; Boeckeler considered *E. mutata* synonymous with *E. spiralis* (Boeckl. l. c. 473). *Schweinfurth* 2326 from Central Africa, has achenes 2.8 mm. long, with a short neck one-half as wide as the achene, and with linear transverse cells. The bristles are without teeth and do not exceed the achene. This was described by Boeckeler,

Flora, lxii. 563 (1876) as *E. fistulosa* var. (β) *robusta* "culmo validiore $2^1/_2$–3 lin. diam. haud compresso, rhizomate elongato lignoso-duro perpendicul. descendente"; it may represent a distinct species.

8. E. Robbinsii Oakes. Fig. 5. Culms slender, 1–2 mm. wide, 2–7 dm. high, triangular, sometimes producing tufts of capillary stems which float in the water: roots either fibrous or spongy; stolons slender and elongate, the nodes inconspicuous: sheaths dull-brown; the summit oblique: spikelet 1–2.5 cm. long, acute, scarcely wider than the culm: scales few (4–9), lanceolate, 7 mm. long, greenish, striate, the margins and tip scarious, with a keel formed by 2 or 3 prominent longitudinal ridges: style 3-fid: stamens 3: achenes brown, 2–2.5 mm. long (not including the slender, elongate style-base), oblong-obovate, narrowed below the middle, lenticular, rarely triangular, turgid, with 15–18 rows of shallow, transversely linear-rectangular cells, narrowed at the apex to a neck one-half the width of the achene, broadening again to form the base of the flattened style: bristles 7, closely and firmly toothed, twice as long as the achene. —Hovey's Mag. Hort. vii. 178 (1841); Britton, Journ. N. Y. Micr. Soc. v. 99 (1889); Robinson & Fernald in Gray, Man. ed. 7, 181, fig. 240 (1908). *E. variegata* Boeckl. Linnaea, xxxvi. 471 (1869–1870) in part.—In shallow water at the borders of ponds, Nova Scotia and southern New Brunswick to Florida, chiefly on the coastal plain, and westward through central New York to Michigan, Indiana and Ontario. The following, from the numerous specimens examined, are typical. Nova Scotia: Belle Isle, *Fernald et al.* 23363; Five Island Lake, *Fernald et al.* 23364; Tiddville, *Fernald & Long*, 20126; Argyle, *Pease, Long & Linder* 20124; Windsor Junction, *Howe & Lang* 404. New Brunswick: Kendrick's Lake, St. Stephen, *Macoun* 32222 (C.). Maine: Wilton, *Fernald* in 1894. New Hampshire: Wentworth, *E. F. Williams* in 1908. Massachusetts: Spot Pond, *Oakes* in 1865; Newton, *Oakes* in 1864; Dedham, *Faxon* in 1878; Plymouth, *Boott* in 1864, *Oakes* in 1839; Brewster, *Fernald* 16296; Yarmouth, *Fernald & Long*, 8841; Springfield, *M. L. Owen* in 1880. Rhode Island: Cranston, *Olney.* Connecticut: North Guilford, *Bartlett* in 1906; Salisbury, *Bissell* in 1906; Monroe, *Eames* in 1895. New York: Wading River, *E. S. Miller* in 1871. New Jersey: Forked River, *Long* 5283; Quaker Bridge, *Parker* in 1867; Delanco, *Van Pelt* in 1907; Dennisville, *Parker* in 1866. Delaware: Felton, *Canby* in 1874. Georgia: Lee Co., near Rift, *Harper* 1068. Florida: *Chapman* (Quincy, according to Chapman, Fl. S. U. S. 515, 1860). Ontario: Temagami Forest Reserve, *W. R. Watson* 442 (C.). Michigan: Park Lake near Agricultural College, *Wheeler* in 1890; Pine Lake near Agricultural College, *Wheeler* in 1897. Indiana: Dune Park, *E. J. Hill* in 1897 and 1898, *Umbach* in Kneucker, Cyp. et Junc. Exsicc. 225.

Described by Oakes from ponds in northern New Hampshire and

southeastern Massachusetts. In outward appearance close to *E. variegata* var. *laxiflora*, from which it differs in its smaller stature, more slender stolons, longer scales, and in the elongate, shiny, less turgid achenes conspicuously narrowed at the apex. It also has a superficial resemblance to *E. philippinensis*. Specimens collected by Wheeler in Michigan in 1890 differ from the typical *E. Robbinsii* in having the tubercle not contracted at the base, and bristles not exceeding the achene. A few of the achenes which were examined were triangular.

9. E. ELONGATA Chapm. FIG. 6. Culms very slender, usually less than 1 mm. in width, elongated, 5–8 dm. long, often floating on the surface of the water, flattened or obscurely angled: roots fibrous; stolons abundant, brown or straw-colored, elongated, with culms rising from the nodes; spikelets 1–1.5 cm. long, 2 mm. wide, acute: style 3-fid: stamens 3: scales linear, obtuse, 3.5 mm. long, striate, greenish, conspicuously bordered with brown just within the hyaline margin: achenes 1.5 mm. long including the style-base, triangular, light green, obovate (the inner face broadest, with about 12 rows of coarse transversely linear cells), abruptly narrowed at the summit to a short neck one-fourth the width of the achene, from which rises the short acute deep-brown style-base: bristles 6 or 7, equalling the achene, greenish, prominently toothed.—Fl. S. U. S. 515 (1860); Small, Fl. Se. U. S. 182 (1903).—This species is confined to Florida. The following specimens are cited from the Gray Herbarium. FLORIDA: Eustis, Lake Co., *Nash* 944; Lake Como, Putnam Co., *Curtiss* 6674; Dade Co., *Garber* in 1877; *Chapman*.

This plant is closely allied to *E. Robbinsii*. The achenes are characteristically triangular, in this respect differing from any other members of the group, although occasionally triangular achenes occur in *E. Robbinsii*.

10. E. **philippinensis**, n. sp. (FIG. 9), culmi elongati 3–5 dm. alti, circa 2 mm. diametro; radicibus brunneis, stolonibus longis nodis manifestis; vaginis ad apicem laxis; spiculis cylindricis 2–5 cm. longis circa 3 mm. crassis; squamis fusco-viridescentibus quadrifariis subulatis vel lanceolatis circa 4 mm. longis striatis carinatisque, apice exsertis subsquarrosis; achaenio 2–2.3 mm. longo obovato infra medium angustato biconvexo turgido fusco latere utroque cum cellulis hexagonis 15–20-seriatis striato, ad apicem annulo toroso truncato instructo achenio quarto parte angustiore; stylobasi complanato; setis 7, serie interiori apicem stylobasis, serie exteriori apicem achenii aequante retrorsim cum dentibus firmis scabris—*E. variegata* var. *laxiflora* Merrill, Enum. Phil. Pl. 121 (1922), not Clarke.—PHILIPPINE ISLANDS: Luzon, Prov. Bulacan, *Ramos* in Merrill, Phil. Pl.

1461; Prov. Rizal, *Merrill* in Oct. 1909; Prov. Rizal, July, 1906, *Ramos* 1112 (TYPE in Gray Herb.).

This plant differs from *E. variegata* var. *laxiflora* in the soft culms and sheaths, in the slender, elongate spikelet with its spreading scales; in the smaller, more truncate achene, with hexagonal cells (in *E. variegata* var. *laxiflora* the cells are transversely linear); and in the shorter, unequal bristles. It is also related to *E. plicarhachis* of the New World.[1] The hexagonal markings of the achenes and the slender spikelets coincide with Clarke's illustration of the Australian *E. nuda*,[2] but the scale in the illustration is blunt and bristles are lacking. *E. philippinensis* may perhaps constitute a variety of *E. nuda*.

11. E. VARIEGATA (Poir.) Presl in Oken, Isis, xxi. 269 (1828); Kunth, Enum. ii. 153 (1837); Boeckl. Linnaea, xxxvi. 470 (1869–1870), in part. *Scirpus variegatus* Poir. Encyc. vi. 749 (1804). *E. Sieberi* Kunth, Enum. ii. 153 (1837). *Bacothryon variegatum* A. Dietr. Sp. Pl. ii. 92 (1833).

I have seen no authentic material. *Scirpus variegatus* was described by Poiret from specimens collected in Madagascar by Du Petit-Thouars, which, according to Presl and Kunth, are represented in the Willdenow herbarium. In Durand & Schinz,[3] Consp. Fl. Afr. v. 601 (1895), the Asiatic material is referred to var. *laxiflora* C. B. Clarke (*E. laxiflora* Thw.), and *E. Sieberi* (based on *Sieber* 19 from Mauritius, considered by Kunth as probably identical with *Scirpus variegatus*) is included as a synonym. Typical *E. variegata*, therefore, seems to be confined to Madagascar and Mauritius. The distribution is stated by Clarke as India, China, Malaysia, Polynesia and Cuba, but the Philippine plants are clearly distinct, and so is the Cuban material (*E. plicarhachis* = *E. elata*).[4] As treated by Boeckeler,[5] *E. Robbinsii* from North America is included under *E. variegata*, and *E. Sieberi* is maintained as a distinct species.

Var. LAXIFLORA (Thw.) C. B. Clarke. FIG. 10. Culms slender, terete or obscurely angled, striate, sulcate, 3.5–6 dm. high, rigid and flexuous, about 2 mm. wide: stolons thickened: sheaths firm, closely appressed at the summit, pointed, purplish at the base: spikelets 1–2 cm. long, cylindric or somewhat angled: scales rigid, lanceolate, 5 mm.

[1] See discussion under *E. plicarhachis*.

[2] Clarke, Ill. Cyp. t. xxxv, figs. 8–10 (1909).

[3] The text was contributed by C. B. Clarke.

[4] C. B. Clarke maintained *E. elata* as a distinct species. Kew Bull. Add. Ser. viii, 105 (1908).

[5] Linnaea, xxxvi. 471 (1869–1870).

long, often keeled, straw-colored or light brown: style 3-fid: stamens 3: achene rough, elliptic, 2.5–3 mm. long (including the style-base), biconvex, turgid, light-brown, with about 20 rows of transversely linear cells, the longitudinal ridges prominent, and an annular prominence at the somewhat narrowed apex, from which the flattened brown style-base rises: bristles 6 or 7, light-brown or yellow, coarse, strongly toothed, all exceeding the beak (style-base).—Clarke in Hook. f. Fl. Brit. Ind. vi. 626 (1893)[1] and in Durand & Schinz, Consp. Fl. Afr. v. 601 (1895), not C. B. Clarke, Cont. U. S. Nat. Herb., x. 455 (1908) nor Merrill, Enum. Phil. Pl. i. 121 (1922). *Scirpus laxiflorus* Thw. Pl. Zeyl. 435 (1864). *E. ochrostachys* Steud. Cyp. 80 (1855). *E. subulata* Boeckl. Flora, xli. 412 (1858); Koorders, Excursfl. Java, i. 197 (1911).—Southeastern Asia and Fiji Islands. CEYLON: *Thwaites* 3762 (TYPE COLL.). CHINA: Hong Kong, *Hance* 13333. FIJI ISLANDS: Sandalwood Bay, *U. S. Exploring Exped.* (Wilkes Exped.) 1838–1842.

The above description is based mainly upon *Thwaites* 3762. Thwaites raised the question whether *Scirpus laxiflorus* was to be considered as a form of *Eleocharis Sieberi*.[2] This, it seems to me, is the chief reason for uniting the Du Petit-Thouars Madagascar plants with the plants from India, *i. e.* the consideration of *S. laxiflorus* as a variety of *E. variegata*. No authentic specimens of *E. variegata* have been seen by me, but the descriptions seem not applicable to the Indian material.

C. B. Clarke in Hook. f. Fl. Br. Ind. vi. 626 (1893) cites *E. ochrostachys* from "MALACCA; *Griffith*. SINGAPORE; *Ridley*,—DISTRIB. Java, Borneo. . . *Spikelet* less than ½ in.—This does not differ much from very slender examples of *S. variegata* var. *laxiflora*, except by the numerous barren stems." *E. ochrostachys* was based upon *Zollinger* 291 from Java. The specimen under this number at the Gray Herbarium from "rice fields, Java" has only one fertile culm, and on that the spikelet is very small (5 mm.). Two of the remaining culms have rudimentary development of spikelets and the plant seems to have suffered adverse conditions, which may account for the reduction of fertile culms. Both the habit and achene are identical with those of *S. laxiflora*. Boeckeler described *E. subulata* from Griffith's collection from Malacca. This plant, which was without achenes, stood in Boeckeler's estimation closest to *E. ochrostachys* Steud. and *E. planiculmis* Steud. It was reduced

[1] Ridley's combination in Journ. Sing. Asiatic Soc. xxiii. 14 (1891) is without description or reference and a *nomen nudum*.

[2] Pl. Zeylan. 435 (1864).

to synonymy with *E. ochrostachys* by C. B. Clarke. The Wilkes Exped. specimen from Fiji is identical with a plant from the same expedition labeled "*E. obtusetrigona* Nees, Organ Mts. Brazil." There is evidently a confusion of labels.

12. E. **plicarhachis** (Griseb.), n. comb. Fig. 7. Erect from an ascending spongy rootstock, often with slender elongate rhizomes: culms wiry, flexuous, striate and sulcate, 2.5–6 dm. high: sheaths usually rigid, 4–8 cm. long, purplish or straw-colored, oblique at the summit: spikelets 1–2 cm. long, about 25-flowered, narrowly cylindric, acute: scales loose, 3.5 mm. long, linear, obtuse, striate, with an obvious midrib: style 2-fid: stamens 3: achene biconvex, 2 mm. long (including beak), light-brown, orbicular to obovate, with about 12 longitudinal rows of quadrate cells with upraised edges, narrowed at the summit and surmounted by a turgid annulus-elevation from which rises the deep-brown or black lanceolate style-base: bristles 6, exceeding the achene, coarse, flat, with strong scattered teeth. —*Scirpus plicarhachis* Griseb. Cat. Pl. Cub. 239 (1866). *E. elata* Boeckl. Vidensk. Medd. Kjöb. (1871) 151 (1871). *E. variegata* Boeckl. Flora, lxiv. 78 (1881), not Presl. *E. variegata* var. *laxiflora* Clarke in Urb. Symb. Ant. ii. 62 (1900) and Contr. U. S. Nat. Herb. x. 455 (1908), not *S. laxiflorus* Thw.—West Indies and South America. Cuba: *C. Wright* 3372 (type coll.). Paraguay: Lake Ipacaray, *Hassler* 12570 (as *E. elata*). Colombia: Dept. of Antioquia, Puerto Berrio, *F. W. Pennell* 3727.

Superficially resembling *E. philippinensis*, from which it differs in the shorter spikelet (in *E. philippinensis* the spikelet is 2.5–5 cm. long) and more appressed scales. In *E. philippinensis* the achenes are longer (2.2–3 mm.), more opaque, with hexagonal, more deeply-pitted cells and surmounted by a wider annulus and with a style-base similar in color to the achene; the bristles also are coarser and equipped with more numerous teeth. *E. plicarhachis* is also similar to *E. variegata* var. *laxiflora*, which has a much coarser culm and which differs in the opaque, turgid character of the achenes, in the more elevated annulus, in the dentition of the bristles and in the thick scaly stolons.

13. E. dulcis (Burm. f.) Trin. Fig. 16. Culms terete, 4–12 dm. high, 3–5 mm. thick, with conspicuous joints at intervals of 2 to 5 cm. and numerous regular but inconspicuous false septa between the joints, from a short vertical rootstock with coarse reddish-brown roots and prominent elongated stolons: sheaths membranous, pointed at the tip, quickly disintegrating: spikelets 1.5–6 cm. long, cylindric, acute, of the same diameter as the culm: scales light-gray or straw-colored, obovate, acute or blunt, chartaceous, 4–5 mm. long, striate,

with a midrib: style 2- or 3-fid; stamens 3: achene 1.8–2 mm. long (excluding the style-base), lenticular, elliptic, brown, the surface with numerous small hexagonal cells, rarely with no reticulations, narrowed at the summit to an inconspicuous annular thickening about half the width of the achene, from which rises the dark-brown flattened style-base: bristles 6–8, exceeding the achene, light-brown, usually irregularly toothed.—Trin. ex Henschel, Vita Rumph. 186 (1833); Merrill, Interpret. Herb. Amb. 104 (1917), Enum. Phil. Pl. i. 119 (1922). *Cyperus dulcis* Rumph. Herb. Amb. vi. 7, t. 3, fig. 1 (1750). *Andropogon dulce* Burm. f. Fl. Ind. 219 (1768). *Hippuris indica* Lour. Fl. Cochinch. 16 (1790). *E. plantaginea* R. & S. Syst. ii. 150 (1817); Thw. Pl. Zeylan. 352 (1864); Boeckl. Linnaea, xxxvi. 474 (1869–1870), excl. the American plant; Hook. f. in Trimen, Fl. Ceylon, v. 68 (1900); C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 625 (1893), in Durand & Schinz, Consp. Fl. Afr. v. 600 (1895) and Ill. Cyp. t. xxxiii. figs. 1–5 (1908). *Carex tuberosa* Blanco, Fl. Filip. 35 (1837), ed. 3, i. 45, t. 15 (1877), not Degl. *Scirpus plantaginoides* Rottb. Desc. et Ic. 45, t. xv. fig. 2 (1773). *S. plantagineus* Retz. Obs. v. 14 (1789). *S. tuberosus* Roxb. Fl. Ind. (ed. Wall.) i. 213 (1820). *S. tumidus* Roxb. Fl. Ind. (ed. Wall.) i. 215 (1820). *E. tumida* R. & S. Mant. ii. 86 (1824). *E. tuberosa* R. & S. Mant. ii. 86 (1824). *S. interceptus* Roxb. acc. to Nees in Wight, Contrib. Pl. Ind. 114 (1834). *E. austro-caledonica* Vieillard, Ann. Sci. Nat. sér. 4, xvi. 38 (1862) acc. to F. Mueller, Fragm. viii. 239 (1874). *E. plantaginoidea* W. F. Wight, Contrib. U. S. Nat. Herb. ix. 267 (1905). —Southeastern Asia to Madagascar, Philippine Islands, Fiji Islands. India: *Thomson;* Bengal, *Griffith; Wallich* 3454[a]. China: Hupeh, *A. Henry* 4247; Pekin (cult.), *Bretschneider* in 1881. Japan: Musashi, *Watanabe* in 1888; *Sakuraj* 48. Fiji Islands: *Seemann* 698. Philippine Islands: Prov. Luzon, Bulacan, *Merrill* 395.

Merrill, Interpret. Herb. Amb. 104 (1917), has discussed in detail the synonymy of this species. It is variable in height and in the septation and rigidity of the culms. The achenes show variation in the surface markings. In *Seemann* 698 (Fiji Islands) the achenes are light-brown, with small but prominent square or slightly elongated cells in 50–60 rows and with blunt scales. In *Merrill* 395 the culm is lax and the pittings on the achene are entirely absent, leaving the achene smooth except for some minute striations. A specimen (*Watanabe* in 1888) from Musashi, Japan, most nearly approaches in its hexagonal pitting and texture of the bristles Clarke's illustration of *E. plantaginea*.[1] It is possible that several entities are involved in this widely distributed species. The edible tubers are raised in large quantities in the Orient.

[1] Clarke, Ill. Cyp. t. xxxiii. figs. 1–5 (1908).

14. E. SPHACELATA R. Br. FIG. 15. Culms exceeding 7 dm. in height, septate at intervals of 1 to 5 cm. with false septa interspersed: spikelets cylindric, 2.5–4 cm. long, somewhat acute: scales obovate to broadly lanceolate, obtuse, about 1 cm. long, light-brown with a deep-brown margin or sometimes with only a dark spot at the apex, scarcely striate, occasionally with a faint nerve in the middle: style 2- or 3-fid: stamens 3: achene 2–2.5 mm. long (not including the style-base), orbicular, light-brown, biconvex, turgid, covered with minute hexagonal or quadrangular reticulations, surmounted by an annular thickening from which rises the deep-brown, flattened style-base: bristles 6–9, about 4 mm. long, much exceeding the body of the achene, light-brown, sparsely toothed.—Prod. 224 (1810); Kunth, Enum. ii. 154 (1837); Hook. f. Fl. N. Zel. i. 269 (1853) and Handb. Fl. N. Zel. 300 (1864); Boeckl. Linnaea, xxxvi. 475 (1869–1870); Mueller, Frag. viii. 239 (1874); Benth. & Muell. Fl. Austral. vii. 292 (1878); C. B. Clarke, Ill. Cyp. t. xxxiv. figs. 1–6 (1909); Cheeseman, Man. Fl. N. Z. ed. 2: 216 (1925). *Scirpus sphacelatus* Spreng. Syst. i. 204 (1825). *E. biseptata* Steud. Cyp. 82 (1855). *E. subsphacelata* Steud. Cyp. 317 (1855). *E. esculenta* Vieillard, Ann. Sci. Nat. sér. 4. xvi. 37 (1862).—Australia, Tasmania and New Zealand. The specimens represented in Gray Herbarium are AUSTRALIA: Austral. felix, *Mueller*. TASMANIA: *Gunn*. NEW ZEALAND: Takapuna, North Isl., *T. Kirk* 208.

Cheeseman (l. c.) considers *E. sphacelata* "an abundant Australian and Tasmanian plant, and very closely allied to the widely diffused *E. plantaginea* R. Br." but the characters which separate the two species are not mentioned. The reticulations are variable and are often quadrate. C. B. Clarke's illustrations (l. c.) of *E. sphacelata* and *E. plantaginea* seem almost identical. In specimens at the Gray Herbarium, *E. sphacelata* is characterized by much larger spikelets, light-brown scales edged with darker brown, and coarser achenes, often with 8 or 9 bristles. F. Meuller (l. c. 239) describes the achene of the Australian *E. plantaginea* as lightly seriate-punctulate, shining-brown, in age becoming very smooth and dark, and with very narrow bristles. *E. sphacelata*, according to Mueller, extends from the Gulf of St. Vincent and Torrens Lake through the whole of Australia (except the West) to the tropic of Capricorn. The achene is round, somewhat compressed, shining, grayish-brown, punctulate, truncate below the style. The spherical starchy tubers, often an inch long, are the most esteemed of all and serve as food for the natives, either fresh or roasted. Vieillard, Ann. Aci. Nat. sér. 4. xvi. 37 (1862), in describing *E. esculenta* (represented by no. 1456 in herb. from New Caledonia) states that the culms are septate, 40–50 cm. high; the

achenes shining-black, and the bristles 8, of unequal length. The tubers are edible. According to Vieillard, these two species, *E. esculenta* and *E. austro-caledonica*, are used by the natives of New Caledonia for making the mantles which they wear during the rainy weather and during the night. These garments, which have the form of a triangular shawl, are woven together on the side next to the body, while the exterior is covered by the ends of the culms, the long stalks overlapping one another. Merrill has included *E. esculenta* as a synonym of *E. equisetina*, but judging from the large size of *E. esculenta* in Vieillard's description, it seems to belong under *E. sphacelata*.

15. E. EQUISETINA Presl. FIG. 14. Culms terete, slender, 5–8 dm. high, 2–3.5 mm. wide, septate, from a short vertical rootstock, with coarse brownish roots: sheaths membranous, usually disintegrating: spikelets 2–4 cm. long, cylindric, acute or obtuse, usually somewhat thicker than the culm: scales 4–5 mm. long, straw-colored, orbicular, with a broad rounded, almost truncate, upper margin, striate, rigid: style 2-fid: stamens 3: achene 2–2.4 mm. long (including the style-base), lenticular, elliptical, the shining brown surface punctulate, narrowed at the base, the summit passing gradually into the flattened dark-brown style-base: bristles 6–7, light-brown, as long as the beak, with soft retrorse teeth.—Rel. Haenk. i. 195 (1828); Steud. Cyp. 82 (1855); C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 626 (1894), in Bot. Tidsk. xxiv. 85 (1901), in Phil. Journ. Sci. Bot. ii. 89 (1907); Merrill, Fl. Manila, 114 (1912), Enum. Phil. Pl. i. 120 (1922). *E. plantaginea* Vidal, Phan. Cuming .Phil. 156 (1855). *E. esculenta* Vieillard, Ann. Sc. Nat. sér. 4, xvi. 37 (1862) acc. to Merrill.—Merrill gives the range as Ceylon to Madagascar, Malaya and New Caledonia. Specimens in the Gray Herbarium are CHINA: Amoy, *Hance* 1391. PHILIPPINE ISLANDS: Manila, Kneucker (coll. *Merrill*) 224; Luzon, Prov. Sorsogon, *Elmer* 14341.

According to Presl, the plant "affinis *E. plantagineae*, differt magnitudine duplo minore, glumis magis subrotundis, stylo bifido, caryopside ancipite setarum longitudine." As represented by the specimens in the Gray Herbarium, the achenes are lenticular, not turgid, and characterized by punctulate, not reticulate, achenes.

SPECIES DOUBTFUL OR NOT SEEN

E. OBTUSETRIGONA (Lindl. & Nees) Steud. Cyp. 80 (1855). *Limnochloa obtusetrigona* Lindl. & Nees in Mart. Fl. Bras. ii.[1] 100 (1842). *E. mutata* var. *obtusetrigona* (Lindl. & Nees) Clarke in Bull. Herb. Boiss. vi. Append. 1, 20 (1898).—BRAZIL.

Steudel (l. c.) notes that Nees has taken this name from Lindley's

herbarium name, but that Nees had never seen the authentic *Salzmann* specimens upon which it was founded.

E. MITRATA (Griseb.) Clarke in Urban, Symb. Ant. ii. 62 (1909) and Ill. Cyp. t. xxxiii. figs. 10–13 (1909). *Scirpus mitratus* Griseb. Fl. Br. W. Ind. 570 (1864).—Clarke cites *Crueger* 24 from Trinidad, and includes as a synonym *E. Jelskiana* Boeckl. Linnaea, xxxviii. 376 (1874).

This species may be *E. plicarhachis* or more probably *E. fistulosa*. Grisebach describes the achene as pale, obovate-roundish, subtruncate and *produced into a tumid ring* around the tubercle, constricted at the base, biconvex, longitudinally 11–13-costate on each side, twice as long as the bristles; tubercle compressed, bluntly conical, nearly half as long as the achene, deciduous.—Based on *Crueger* 24.

E. BRASILIENSIS Boeckl. Cyp. Nov. ii. 13 (1890). "Car. juvenili oblonga obtusa *longitudinaliter striata* fusca; stylo longiusculo complanato apice bifido; perigonii setis 6, caryopsi longioribus. . . .— E vicinia H. elatae Boecklr."—In swamps near Queluz, prov. Minas Geraes, coll. *H. Schenck*.

E. ALTA Boeckl. Cyp. Nov. i. 17 (1888). The achene is not described but the plant is stated to be close to *E. variegata*.—Java, Vulcan Gede, alt. 2400 m.

According to O. Kuntze, Rev. Gen. 757 (1891) it is *Scirpus tetraquetrus* Kuntze (*E. tetraquetra* Nees).

E. NUDA Clarke, Ill. Cyp. t. xxxv. figs. 9–11 (1909).

This occurs in Australia, and is probably close to *E. philippinensis*.

E. COMPACTA R. Br. Prod. 224 (1810).

Bentham (Fl. Austral.) considers it a synonym of *E. variegata*. In the Gray Herbarium is a specimen from India (Punjab, coll. *T. Thomson*) labeled *E. compacta* Br., but this specimen, although superficially resembling members of the series *Mutatae*, clearly is not a member of it.

E. PERUVIANA Clarke, Kew Bull. Add. Ser. viii. 105 (1908) (name only).

I have not been able to find a description of this species.

E. SAGOTII Clarke, Kew Bull. Add. Ser. viii. 20 (1908).—FRENCH GUIANA.

GEOGRAPHICAL DISTRIBUTION OF SERIES MUTATAE

This series comprises about twenty species of mostly coarse perennial plants with prominent stolons, and, in the case of *E. dulcis* of the Orient and *E. sphacelata* of the Australian region, producing

conspicuous tubers which are utilized for food. The plants are always more or less immersed, varying in the mechanical structure of the culm from terete jointed types which have a superficial resemblance to species of *Equisetum*, to sharply triangular or quadrangular forms. They occur chiefly in warm temperate or subtropical regions from which they extend into the tropics and into the cooler temperate regions. The center of distribution is apparently in subtropical and warm-temperate eastern America, but three species occur in temperate North America along the Atlantic Coastal Plain and inland to the Great Lakes or the Mississippi Valley; *E. Robbinsii*, which has the greatest range, extending to Nova Scotia, Ontario and Michigan. In Florida alone there are five distinct species (*E. elongata*, *E. Robbinsii*, *E. cellulosa*, *E. equisetoides* and *E. quadrangulata*). Many are superficially alike and there has been a tendency to consider Old World and New World species as identical. However, *E. fistulosa* seems to be the only one common to both hemispheres.

EXPLANATION OF PLATE 188

(Achenes × 10)

Fig. 1, ELEOCHARIS EQUISETOIDES, Massachusetts, *Morong;* 2, E. INTERSTINCTA, Cuba, *Wright* 710; 3, E. FISTULOSA, Ceylon, *Thwaites* 3162; 4, E. QUADRANGULATA, Massachusetts, *Pl. Exsicc. Gray*, 133; 5, E. ROBBINSII, Massachusetts, *Fernald*, 16,296; 6, E. ELONGATA, Florida, *Nash* 944; 7, E. PLICARHACHIS, Cuba, *Wright*, 3372; 8, E. MUTATA, Porto Rico, *Sintenis* 4942; 9, E. PHILIPPINENSIS, Luzon, *Ramos* 1112; 10, E. VARIEGATA var. LAXIFLORA, Ceylon, *Thwaites* 3762; 11, E. CELLULOSA, Florida, *Curtiss* 6540; 12, E. SPIRALIS, Borneo, *Clemens* 9716; 13, E. FISTULOSA var. ROBUSTA, Djur, *Schweinfurth* 2326; 14, E. EQUISETINA, Philippines, *Elmer* 14,341; 15, E. SPHACELATA, New Zealand, *Kirk* 208; 16, E. DULCIS, Japan, *Watanabe.*

(*To be continued.*)

TWO VARIANTS OF RANUNCULUS RECURVATUS

C. A. WEATHERBY

RANUNCULUS RECURVATUS Poir., as it occurs commonly in moist woodlands and along shaded brooks, has the stem villous with spreading, mostly 2–3-celled hairs, and is described as "pubescent" by Poiret and subsequent authors. As in many other cases, however, this pubescence is variable in quantity, and Mr. E. B. Harger has called my attention to the existence of a form in which the stem is wholly glabrous, at least up to the first flower-bearing branch. It differs from the typical form in no other respect than lack of pubes-

cence and is connected with it by various intermediate stages; and, so far as the material in the Gray Herbarium shows, it has no distinctive range, but is likely to appear throughout the range of the species. It can, therefore, hardly claim systematic rank above that of forma; but since its existence quite upsets one of the key characters given for the species in current manuals, it appears to demand some recognition. With Mr. Harger's assent, it is here proposed as

Ranunculus recurvatus Poir., f. **laevicaulis** Harger, n. f., caule saltem infra ramum infimum floriferum omnino glabro.—New Hampshire: edge of rocky brook in woods, Hinsdale, June 9, 1920, *C. F. Batchelder* (herb. N. E. Bot. Club). Vermont: wet woods, Montpelier, June 5, 1913, *C. H. Knowlton* (N. E. B. C.). Massachusetts: by brook, Whately, May 17, 1913, *Fernald & Harger*, type in hb. N. E. B. C. (also a mixed sheet in Herb. Gray). Connecticut: wet woods, Salisbury, June 6, 1915, *Weatherby*, no. 3630 (herb. Weatherby). Virginia: deep, shaded ravine by stream, Williamsburg, June 10, 1920, *Grimes*, no. 2688 (Gray Herb.).

In the course of looking up the above form, it became apparent that there is in the Alleghanian region from central New York to western Virginia a rather stronger variant in which the stem and petioles bear short, closely appressed, mostly unicellular hairs. Since this plant shows a difference in type, not merely in quantity, of pubescence and seems to have a distinctive range (there is no trace of it in the abundant New England collections at Cambridge) it may stand as a variety and is here proposed as

Ranunculus recurvatus Poir., var. **adpressipilis**, n. var., caule petiolisque pilis brevibus arcte adpressis plerumque unicellularibus ornatis.—New York: open, sedgy woods, east of McLean, Groton, Tompkins Co., June 6, 1913, *Eames & MacDaniels*, no. 481. West Virginia: near Travelers' Repose, Pocahontas Co., Sept. 19, 1904, *Greenman*, no. 365. Virginia: Hungry Hollow, alt. 2200 ft., northeast of Marion, Smyth Co., May 24, 1892, *Small*, type in Gray Herb. (as are all the specimens cited).

The following key will serve to summarize the characters of the variants here discussed.

Stem with spreading, mostly 2–3-celled hairs, or glabrous.
  Stem more or less villous throughout ..... *R. recurvatus.*
  Stem completely glabrous up to the first flowering branch.... f. *laevicaulis.*
Stem and petioles with closely appressed, mostly unicellular hairs.
  var. *adpressipilis.*

Gray Herbarium.

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